REMARKS

Claim 1 has been amended. New claims 6-8 have been added. Thus, claims 1-8 are presented for examination. Support for the amendment to claim 1 may found in the specification at page 8, line 12. Support for new claim 6 may be found in the specification at page 8, line 12. Support for new claim 7 may found in the specification at page 22, line 19. Support for new claim 8 may be found in the specification at page 12, line 14. No new matter has been added. Reconsideration and withdrawal of the present rejections in view of the amendments and the comments presented herein are respectfully requested.

Rejections under 35 U.S.C. §102(b)

Claims 1-5 were rejected under 35 U.S.C. §102(b) as being anticipated by Moriuma et al. (US 6,274,287), and Claims 1-3 and 5 were rejected under 35 U.S.C. §102(b) as being anticipated by Miyagi et al. (US 6,187,500).

The present invention has particular applicability to fields that require a thick film process. These include fields relating to magnetic heads, such as giant magnetoresistive (GMR) heads or magnetoresistive (MR) heads, and particularly in the formation of the upper pole of a recording head (a magnetic head). In such fields, a space pattern with a high aspect ratio must be able to be formed with good perpendicularity under thick film conditions of at least 3 μm. Additionally, formation of a resist pattern with good perpendicularity under such thick film conditions using a conventional i-line positive photoresist composition is difficult. (Present specification at page 1, line 20 to page 2, line 2)

The addition of dissolution promoters (low molecular weight compounds with a phenolic hydroxyl group) to positive photoresist compositions has been proposed. However, according to investigations conducted by the present inventors, resist compositions of this type containing an added dissolution promoter such as a typical tris-phenol based dissolution promoter suffer from a marked deterioration in heat resistance, or an inability to achieve an inadequate exposure margin, making the control of dimensions relative to the exposure dose difficult. Furthermore, these dissolution promoters do not display an entirely satisfactory dissolution promotion effect, making it impossible to achieve a satisfactory developing rate. (Present specification at page 2, line 3 to page 3, line 2).

The present inventors made extensive and intensive studies with a view toward solving the above-mentioned problems. As a result, they found that a positive photoresist composition having the components recited in the presently pending claims can solve these problems. The presently recited Component (A) is a resin ester having the functions of both of an alkali-soluble resin component and a photosensitizer component. Such a component can be obtained, for example, by esterifying a polymer as an alkali-soluble resin component with a photosensitizer component. The inventors discovered that when the molecular weight is less than 1000, marked thinning of the unexposed portions occurs during developing, making the formation of a resist pattern (having a thickness of more than 3 μm) far more difficult. On the other hand, when the molecular weight exceeds 50,000, the developing rate and the resolution tend to worsen markedly (see present specification at page 8, lines 12-16).

In order for a claim to be anticipated by a reference, each element of the claim must be found within the reference. Moriuma et al. neither teaches nor suggests a specific novolak resin having a weight average molecular weight of 1,000 to 50,000 in which a photosensitizer component (1,2-naphthoquinonediazidesulfonyl groups) is introduced as recited in amended claim 1. Specifically, the "polyphenol compound" described at column 7, lines 5-10 of Moriuma et al. noted by the Examiner (Office Action, page 3, paragraph 1) is merely a conventional o-quinonediazidesulfonyl ester type photosensitizer obtained by esterifying a polyhydroxy compound with an o-quinonediazidesulfonyl halide (see column 4, lines 13 to 17 of Moriuma et al.). As the polyhydroxy compound, Moriuma only exemplifies compounds having a molecular weight of less than 1,000, which is below, the recited molecular weight range of the novolak resin in the presently pending claims. *See*, column 4, lines 4 to 12 of Moriuma. As discussed above, in the present invention, when the molecular weight is less than 1,000, marked thinning of the unexposed portions occurs during developing, making the formation of a resist pattern (having a thickness of more than 3 μm) far more difficult. Moriuma does not even recognize this disadvantage under thick film conditions of at least 3 μm. Thus, nothing in Moriuma would even suggest the presently claimed invention.

Similarly, Miyagi et al. neither teaches nor suggests a specific novolak resin having a weight average molecular weight of 1,000 to 50,000 in which a photosensitizer component (1,2-naphthoquinonediazidesulfonyl groups) is introduced as recited in amended claim 1. As in the case of Moriuma et al., the naphthoquinonediazide ester taught by Miyagi et al. is merely a

conventional photosensitizer which is an ester of a 1,2-naphthoquinonediazidesulfonic acid and a polyphenolic compound (see column 8, lines 5 to 7 of Miyagi). As the polyphenolic compound, Miyagi only exemplifies monomeric compounds having a molecular weight of less than 1,000 (outside the range of the novolak resin recited in claim 1) (see column 8, lines 7 to 30 of Miyagi et al.). Further, Miyagi does not recognize the disadvantages caused under thick film conditions of at least 3 μm when the molecular weight of the polyphenolic compound (novolak resin) is outside the claimed range of 1,000 to 50,000. Thus, like the Moriuma reference, Miyagi does not even suggest the presently claimed invention.

Even had either of the references suggested the presently claimed invention, the superior effects of the claimed invention over the cited references would still evidence the patentability of the presently pending claims. These results can be seen by comparison of Example 1 of the present application (specification at page 36, lines 6-13) with Comparative Example 3 (specification at page 37, lines 16 to 24).

In Example 1, a photoresist composition of the present invention comprising novolak resin (A) and dissolution promoter (B) is produced. In contrast, in Comparative Example 3, a photoresist composition is produced in substantially the same manner as in Example 1 except that novolak resin (A) is changed to a novolak resin having no 1,2-naphthoquinonesulfonyl groups (corresponding to alkali-soluble novolak resin of the cited references), and a photosensitizer (1-[1-(4-hydroxyphenyl)isopropyl]-4-[1,1-bis(4-hydroxyphenyl)ethyl]benzene in which 2 mol% of the hydrogen atoms of all the phenolic hydroxyl groups has been substituted with 1,2-naphthoquinonediazide-5-sulfonyl groups) (corresponding to naphthoquinonediazide ester compound of the cited references) is further added. As shown in Table 1 of page 38 of the specification, a resist pattern having a film thickness of 7 μm formed from the photoresist composition produced in Comparative Example 3 (corresponding to the photoresist composition of the cited references) exhibits poor properties with respect to cross-sectional shape, resolution and heat resistance, as compared to a resist pattern having a film thickness of 7 μm formed from the photoresist composition produced in Example 1 (photoresist composition of the present invention)

In view of the amendments and comments presented above, Applicants respectfully request reconsideration and withdrawal of the two rejections under 35 U.S.C. 102(b).

CONCLUSION

Applicants submit that all claims are in condition for allowance. However, if minor matters remain, the Examiner is invited to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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